

Przemysław Jarosz-Chobot<sup>1</sup>, Piotr Mołęda<sup>2</sup>, Małgorzata Myśliwiec<sup>3</sup>,  
Dorota Pisarczyk-Wiza<sup>4</sup>, Agnieszka Szadkowska<sup>5</sup>, Tomasz Klupa<sup>6</sup>

<sup>1</sup>Department of Paediatrics, Medical University of Silesia, Katowice, Poland

<sup>2</sup>Department of Diabetology and Internal Medicine, Pomeranian Medical University in Szczecin, Poland

<sup>3</sup>Medical University of Gdansk, Department and Clinic of Pediatrics, Diabetology and Endocrinology, Gdansk, Poland

<sup>4</sup>Poznan University of Medical Sciences, Department of Internal Medicine and Diabetology, Poland

<sup>5</sup>Department of Pediatrics, Oncology, Hematology and Diabetology, Medical University of Łódź, Poland

<sup>6</sup>Unit on Advanced Technologies in Diabetes, Department and Chair of Metabolic Diseases, Jagiellonian University, Krakow, Poland

# The proposal of initial bolus calculator settings in Accu-Chek Combo system

## ABSTRACT

**Bolus calculator feature (BC) is one of the most important options of modern insulin pumps. It enables both periprandial as well as correction insulin dosing. BC function leads to improvement of patient's metabolic control. It makes the treatment safer and limits the number of hypoglycemic episodes. In presented article we propose preliminary setting of BC in the Accu-Chek Combo system. It is obvious that those setting should be always verified according to a clinical situation. (Clin Diabet 2015; 4, 6: 251–253)**

**Key words:** diabetes, insulin pump, bolus calculator

Bolus calculator feature (BC) is one of the most important options of modern insulin pumps (IP) that optimizes the management of diabetes [1–5].

From patient's point of view as of the user of BC, its function is the exact calculation of the appropriate meal and/or correction bolus, based on the amount of active insulin calculated by the device. Using this option allows for a better metabolic control, and also affects the safety of the therapy, by reducing the risk of hypoglycemia [2, 3, 6–13].

For the doctor, BC is a valuable tool for accurate analysis of therapeutic actions taken by the patient [2, 3, 8].

Personal insulin pump Accu-Chek Combo has a modern system of Bolus Advisor which allows the user to customize its settings [3, 5, 6, 8]. Proper use of BC can be based on the following principles:

- BC should be programmed and activated along with setting a patient on a pump for the first time;
- the patient must be clearly informed of the fact that the initial, empirical BC settings may prove suboptimal for him;
- the first verification of the BC settings should take place shortly after activation of this function (optimally within the first 1–2 weeks after connecting IP). Only after analysis of data from a personal insulin pump and possible modification of presets, the suggestions from BC may be for the patient each time a reliable basis for making decisions about meal/corrective dose of insulin [1, 3, 6].

The patient must be advised that in certain clinical situations he may not agree with a dose of insulin proposed by BC and change it.

Analysis of the pump and record data from the meter should be based on data read from devices using a dedicated computer program.

It should be emphasized that the bolus calculator settings in individual personal insulin pumps are based on different, specific to a particular manufacturer algorithms. Therefore, each time there is a change of IP, the BC settings must be re-evaluated, based on the algorithm used in patient's new device.

Below (Table 1) we present a proposal for the initial setup of the BC in Accu-Chek Combo system. These recommendations can serve as a starting point for the

Address for correspondence:

prof. dr hab. n. med. Tomasz Klupa

Unit on Advanced Technologies in Diabetes

Department and Chair of Metabolic Diseases

Jagiellonian University, Krakow, Poland

Phone: +48 (12) 424 83 00

Fax: +48 (12) 421 97 86

e-mail: [tomasz.klupa@uj.edu.pl](mailto:tomasz.klupa@uj.edu.pl)

Clinical Diabetology 2015, 4, 6, 251–253

DOI: 10.5603/DK.2015.0028

Received: 22.11.2015

Accepted: 22.01.2016

Table 1. The proposal of initial settings in BC of Accu-Chek Combo system

Parameter (available range) <sup>1</sup>	Units	Personal settings for given age				
		1–6 years	7–11 years	12–18 years <sup>2</sup>	Adults	Pregnant
Target range of bG						
Lower limit (50–140)	mg/dl	80–100	80–100	80–100	80–100	60
Upper limit (100–300)	mg/dl	100–130	100–130	100–120	100–120	120
Carbohydrate unit						
(G, BE = 12 g, KE = 10 g = WW, CC = 15 g)		KE (WW)	KE (WW)	KE (WW)	KE (WW)	KE (WW)
I-CHO (0,1–24)	U/KE	Rule of 400	Rule of 400	Rule of 400	Rule of 400	Rule of 400
ISF (insulin: 0,1–50; bG: 1–999)		Rule of 1800	Rule of 1800	Rule of 1800	Rule of 1800	Rule of 1800
Warning limits						
Hyper (180–350)	mg/dl	250	250	250	250	180
Hypo (50–90)	mg/dl	60	60	50	50	50
Advice options						
Meal rise (50–200)	mg/dl	80	80	50	50	50
Snack size (0–2,4 WW)	KE	0,5–1,0	1,0–1,5	2	2	2
Acting time (1.5–8 h)	h	3 h	3 h	3 h	3–5 h <sup>3</sup>	3–4 h <sup>3</sup>
Offset time (from 45 min up to „acting time“)	h	1,5 h	1,5 h	1 h	1 h	45 min–1 h <sup>4</sup>
Health events						
Exercise 1	%	Indywidually	Indywidually	Indywidually	–20	–20
Exercise 2	%	Indywidually	Indywidually	Indywidually	–50	–50
Stress	%	Indywidually	Indywidually	Indywidually	+20	+20
Illness <sup>5</sup>	%	Indywidually	Indywidually	Indywidually	From +20 to +50	From +20 to +50
Premenstrual	%	–	Indywidually	Indywidually	+20	–
High bG reminder	Hours	After 1 h	After 1 h	After 1 h	After 1 h	After 1 h
Low bG reminder	Minutes	After 15 min	After 15 min	After 15 min	After 15 min	After 15 min

<sup>1</sup>Explanations of particular functions of BC is included in the user manual<sup>2</sup>Settings may be used as in the case of adults<sup>3</sup>Depending on bolus dose 3 h < 10 U, 4 h < 10–20 U, 5 h > 20 U<sup>4</sup>Depending on trimester<sup>5</sup>Excluding diseases of digestive system

implementation of the BC functions. However, please do not treat these proposals doctrinally, as they may be modified in appropriate clinical situations.

### Conflict of interest

The article was sponsored by Roche Diabetes Care Polska Sp. z o.o.

### REFERENCES

- Shashaj E, Busetto E, Sulli N. Treatment Benefits of a bolus calculator in pre- and postprandial glycaemic control and meal flexibility of paediatric patients using continuous subcutaneous insulin infusion (CSII) B. *Diabetic Medicine* 2008; 25: 1036–1042.
- Colin IM, Paris I. Glucose meters with built-in automated bolus calculator: gadget or real value for insulin-treated diabetic patients? *Diabetes Ther* 2013; 4: 1–11.
- Klonoff DC. The current status of bolus calculator decision-support software. *Diabetes Sci Technol* 2012; 6: 990–994.
- Sussman A, Taylor EJ, Patel M et al. Performance of a glucose meter with a built-in automated bolus calculator versus manual bolus calculation in insulin-using subjects. *J Diabetes Sci Technol* 2012; 6: 339–344.
- Schmidt S, Meldgaard M, Serifovski N et al. Use of an automated bolus calculator in MDI-treated type 1 diabetes: the BolusCal Study, a randomized controlled pilot study. *Diabetes Care* 2012; 35: 984–990.
- Zisser H, Wagner R, Pleus S et al. Clinical Performance of Three Bolus Calculators in Subjects with Type 1 Diabetes Mellitus: A Head-to-Head-to-Head Comparison. *Diabetes Technol Ther* 2010; 12: 955–961.
- Barnard K, Parkin C, Young A, Ashraf M. Use of an automated bolus calculator reduces fear of hypoglycemia and improves confidence in dosage accuracy in T1DM patients treated with multiple daily insulin injections. *J Diabetes Sci Technol* 2011; 6: 144–149.
- Schwartz FL, Guo A, Marling CR, Shubrook JH. Analysis of use of an automated bolus calculator reduces fear of hypoglycemia and improves confidence in dosage accuracy in type 1 diabetes mellitus patients treated with multiple daily insulin injections. *J Diabetes Sci Technol* 2012; 6: 150–152.

9. Matejko B, Grzanka M, Kieć-Wilk B, Małecki MT, Klupa T. Clinical factors affecting the perception of hypoglycemia in type 1 diabetes patients treated with personal insulin pumps. *Ann Agric Environ Med* 2013; 20: 152–154.
10. Rossetti P, Vehí J, Revert A, Calm R, Bondia J. Commentary on “Performance of a glucose meter with a built-in automated bolus calculator versus manual bolus calculation in insulin-using subjects”. *J Diabetes Sci Technol* 2012; 6: 345–347.
11. Walsh J, Roberts R, Bailey T. Guidelines for optimal bolus calculator settings in adults. *J Diabetes Sci Technol* 2011; 5: 129–135.
12. Shapira G, Yodfat O, HaCohen A, Feigin P, Rubin R. Bolus guide: a novel insulin bolus dosing decision support tool based on selection of carbohydrate ranges. *J Diabetes Sci Technol* 2010; 4: 893–902.
13. Pańkowska E, Błazik M. Bolus calculator with nutrition database software, a new concept of prandial insulin programming for pump users. *J Diabetes Sci Technol* 2010; 4: 571–576.

